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Tagawa

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(45) **Date of Patent: May 3, 2016**

(54) **ELECTRICAL CONNECTOR**

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H01R 13/24 (2006.01)
(Continued)

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CPC ***H01R 13/2442*** (2013.01); ***H01R 12/55*** (2013.01); ***H01R 12/716*** (2013.01)

(58) **Field of Classification Search**
CPC H01R 13/2442; H01R 13/24; H01R 12/55; H01R 12/716; H01R 12/71
USPC 439/626, 66, 65, 79, 80
See application file for complete search history.

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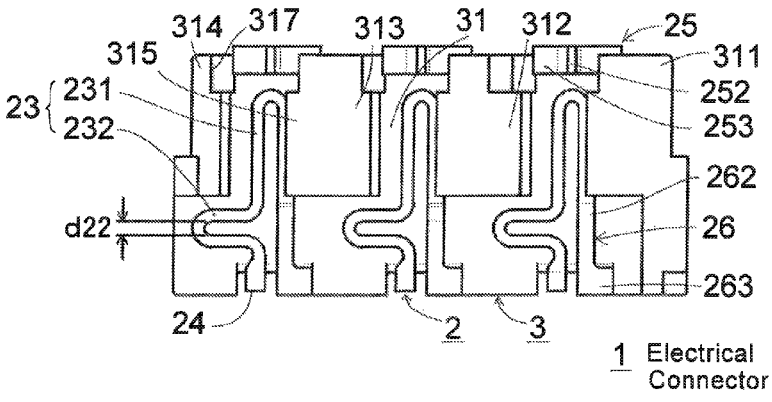
(57) **ABSTRACT**

An electrical connector allowing a housing and a contact portion to be displaced relative to a mounting circuit board, parallel to a board surface, without a reinforcing plate separate from a contact member. A basal portion of a contact member is present along an upper surface of a base portion of a housing. A mounting-side elastic portion of the contact member is present along a lower surface of the base portion of the housing. A folding-back portion of the contact member is located at a rear of the base portion of the housing to connect the basal portion to the mounting-side elastic portion. First and second connecting leg portions extend downward from the mounting-side elastic portion. Each tip side of the leg portions acts as a mounting portion for a circuit board at positions different from each other in a front-back direction.

13 Claims, 9 Drawing Sheets



(51) **Int. Cl.**
H01R 12/55 (2011.01)
H01R 12/71 (2011.01)

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Fig. 1

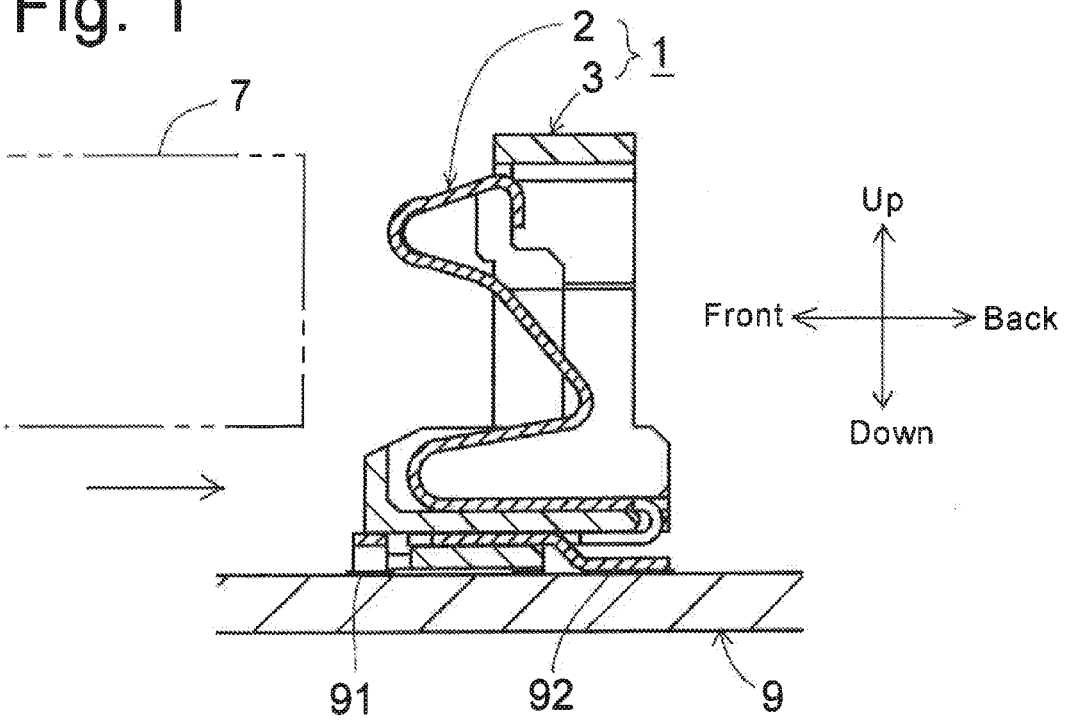

2
1
3
7
Up
Front
Back
Down
91
92
9

Fig. 2

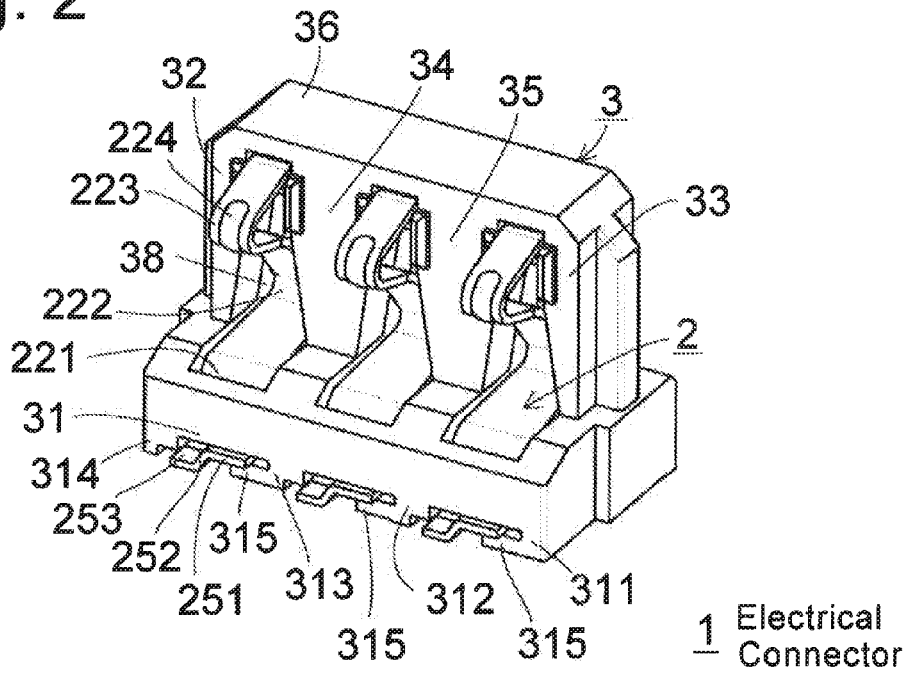

36
32
34
35
3
224
223
33
38
222
2
221
31
314
253
252
315
251
313
312
311
315
315
1 Electrical Connector

Fig. 3

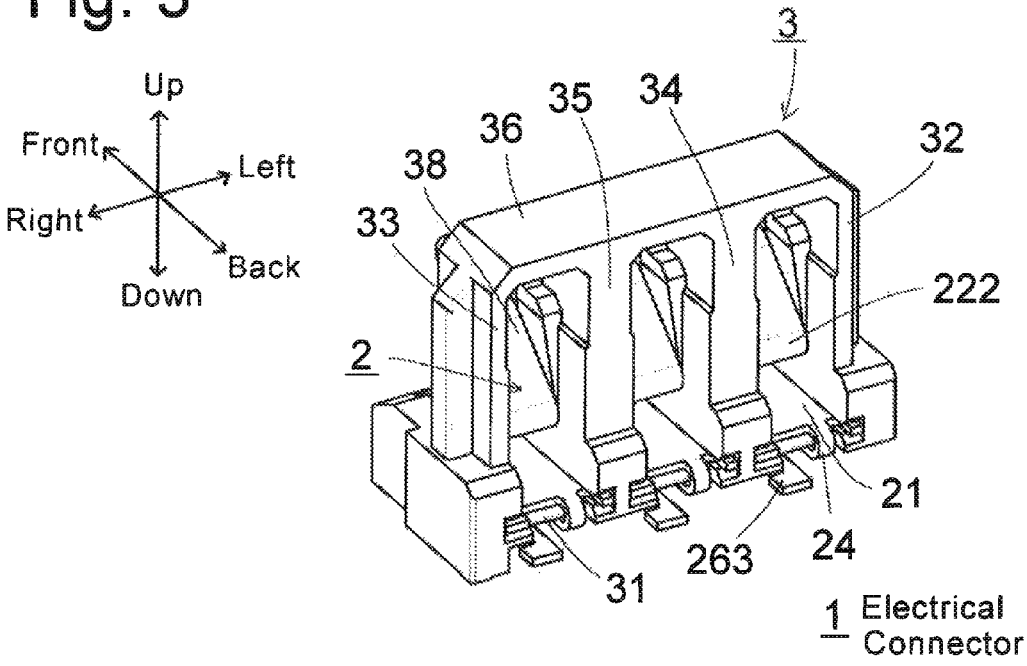
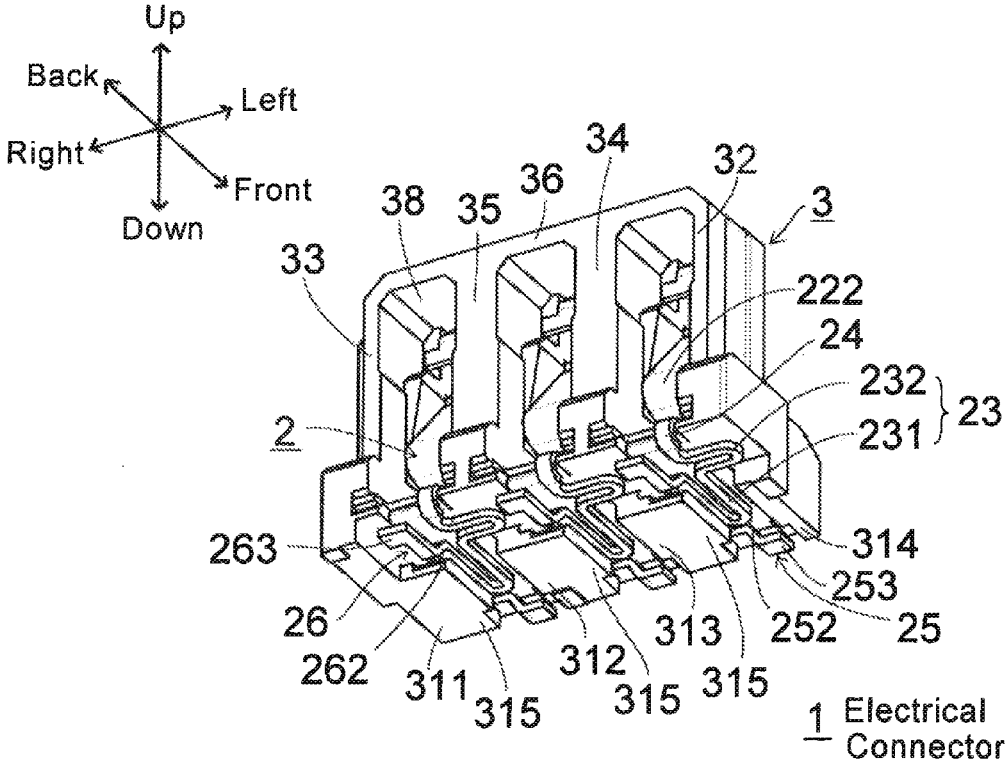

Up
Front
Left
Right
Back
Down
3
35
34
36
32
38
33
222
2
21
263
24
31
1 Electrical Connector

Fig. 4


Up
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222
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232
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263
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1 Electrical Connector

Fig. 5

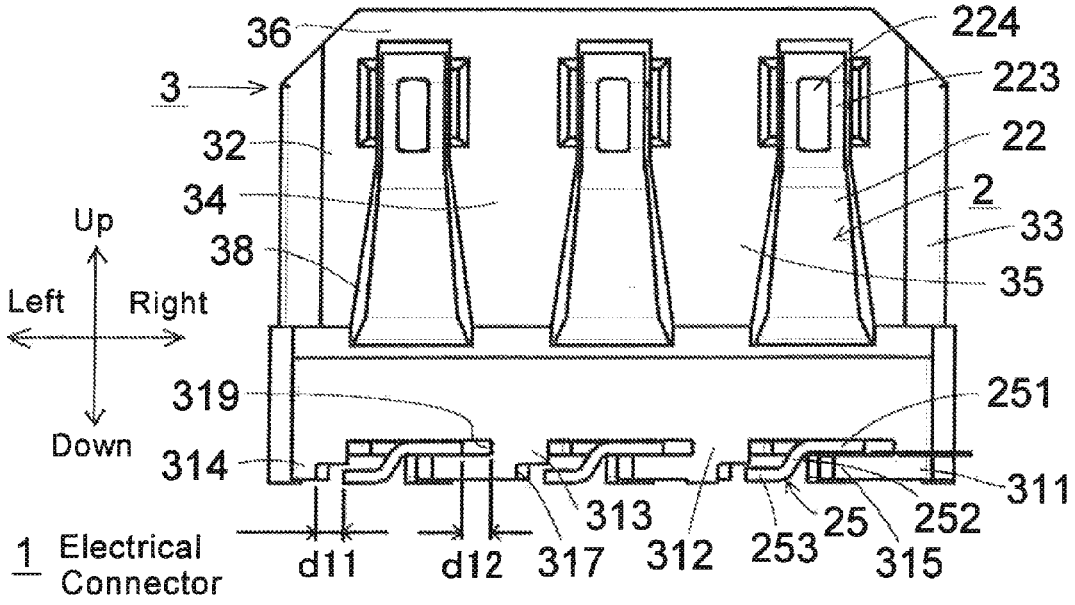
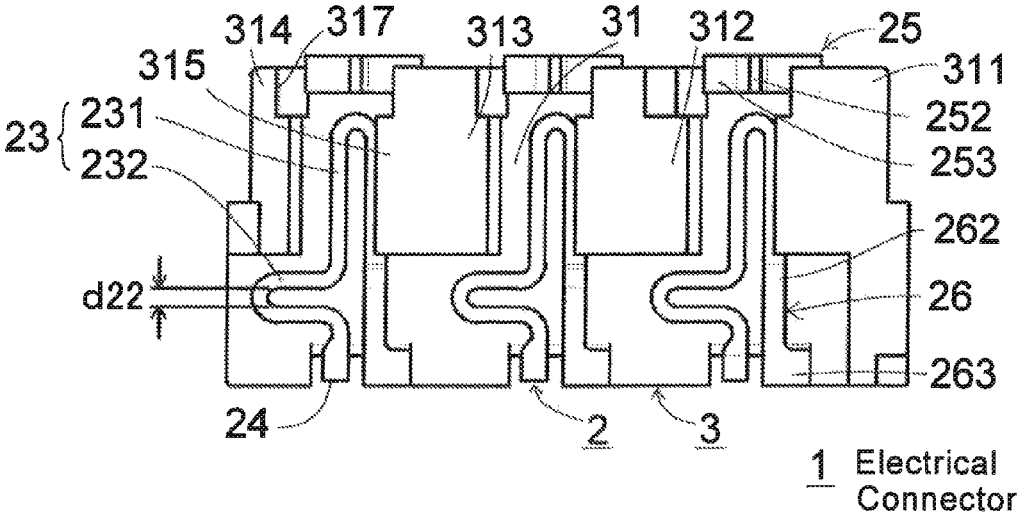

36
3
32
34
38
Up
Left
Right
Down
319
314
1 Electrical Connector
d11
d12
317
313
312
253
25
315
252
311
251
35
33
2
22
223
224

Fig. 6


314
317
313
31
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262
d22
26
263
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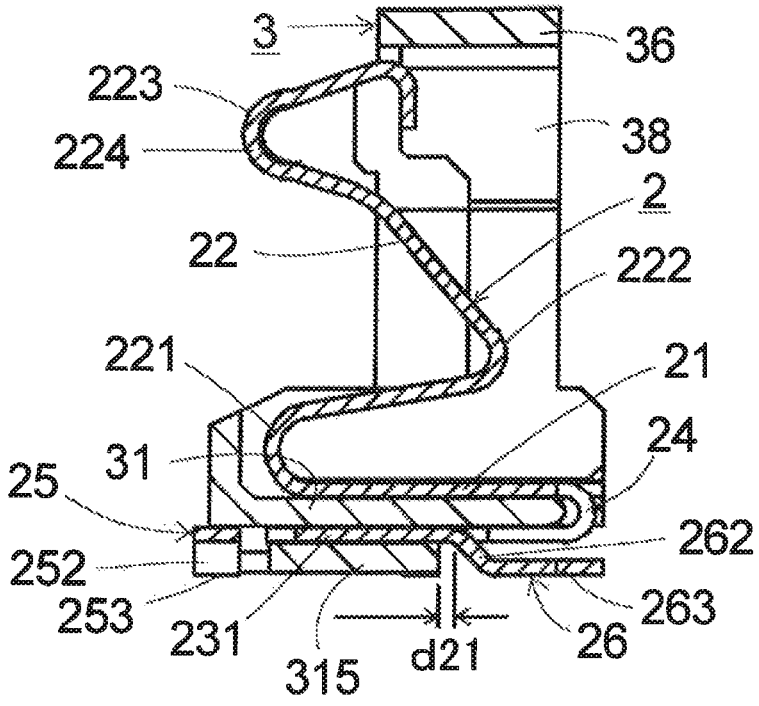
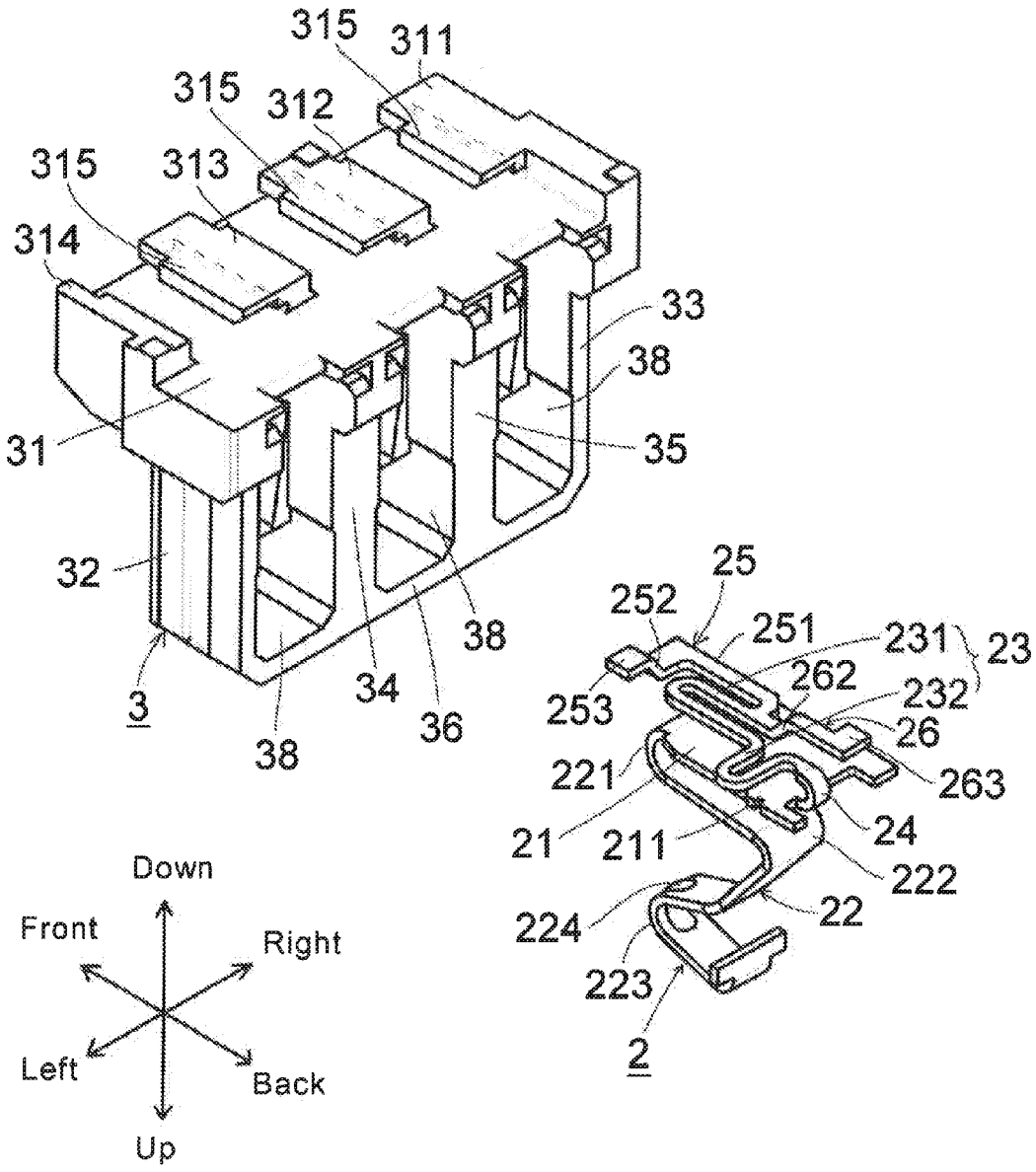
2
3
1 Electrical Connector

Fig. 7



1 Electrical Connector

Fig. 8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262
232
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263
21
211
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222
224
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223
2
Down
Front
Right
Left
Back
Up

Fig. 9

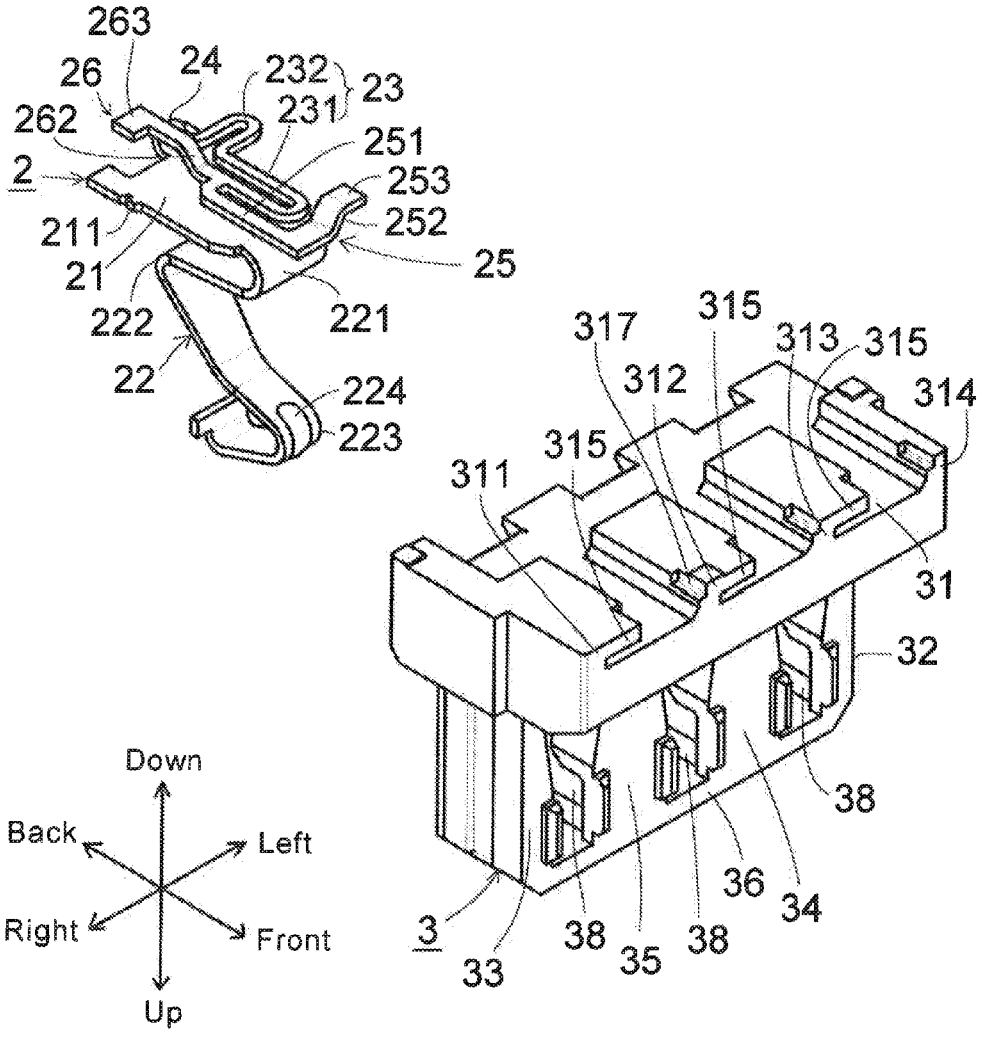
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Fig. 10

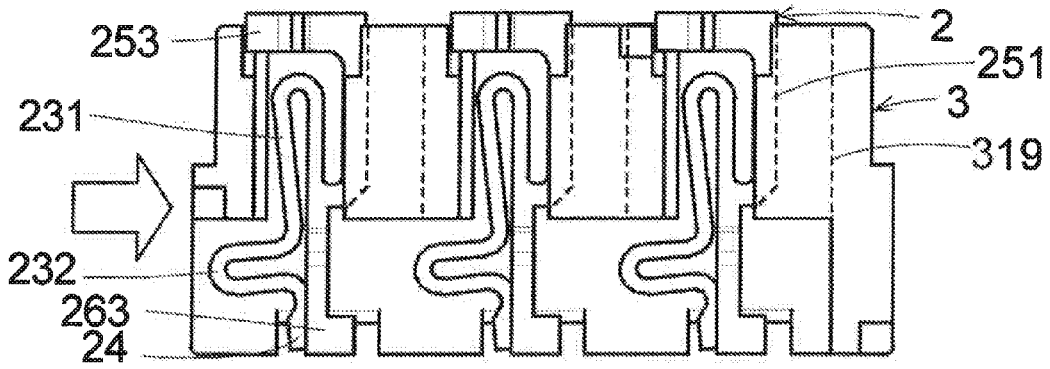


Fig. 11

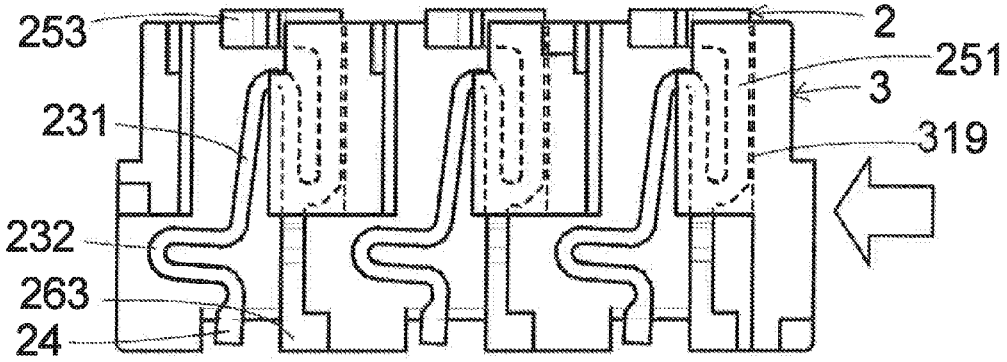


Fig. 12

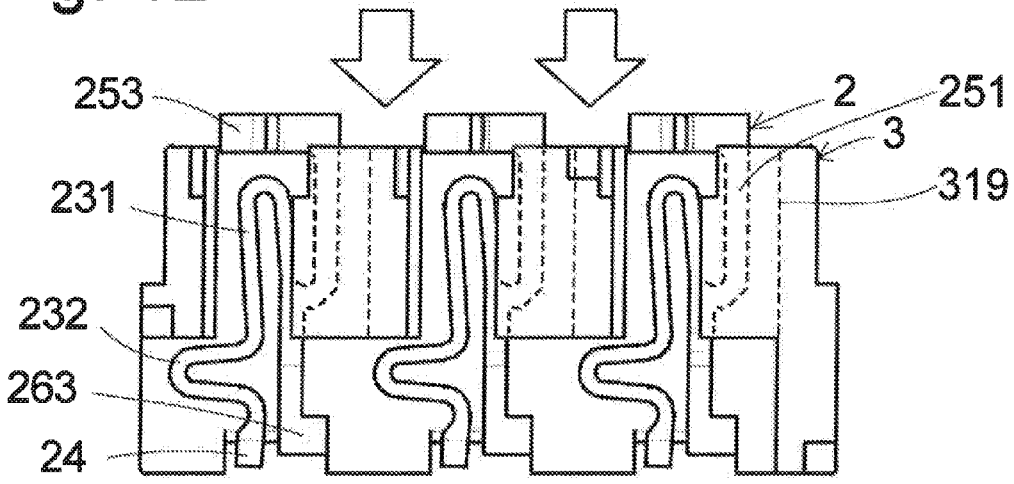
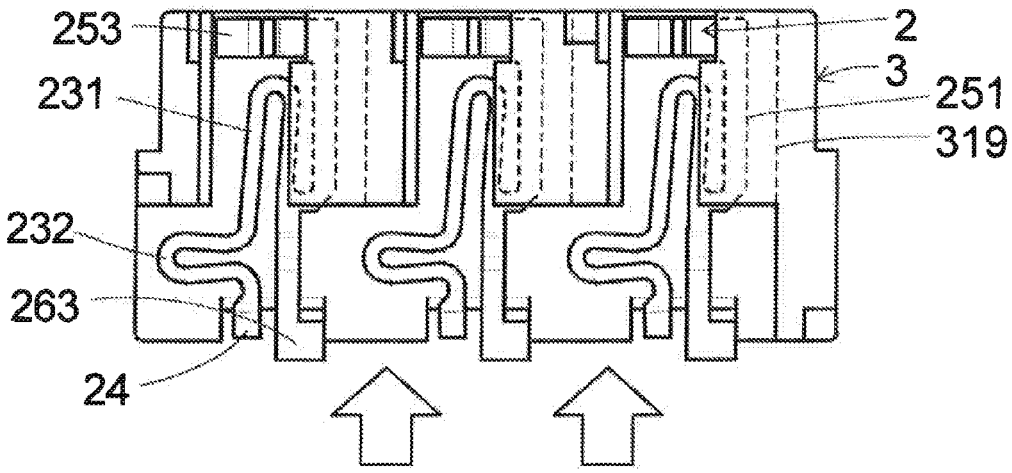


Fig. 13


253
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232
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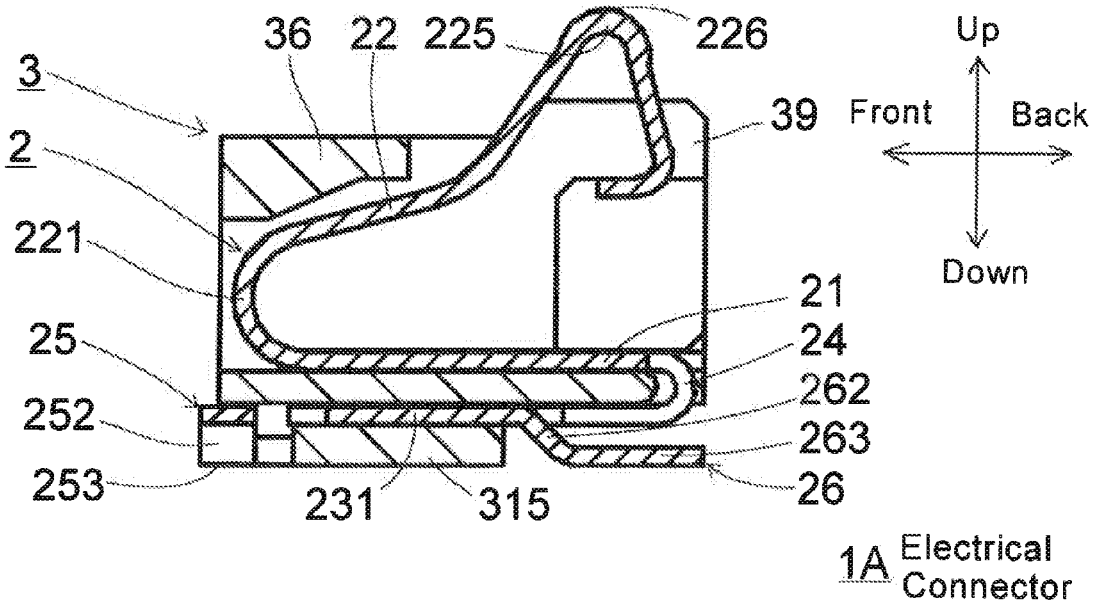
Fig. 14


36
22
225
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3
2
221
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253
231
315
21
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263
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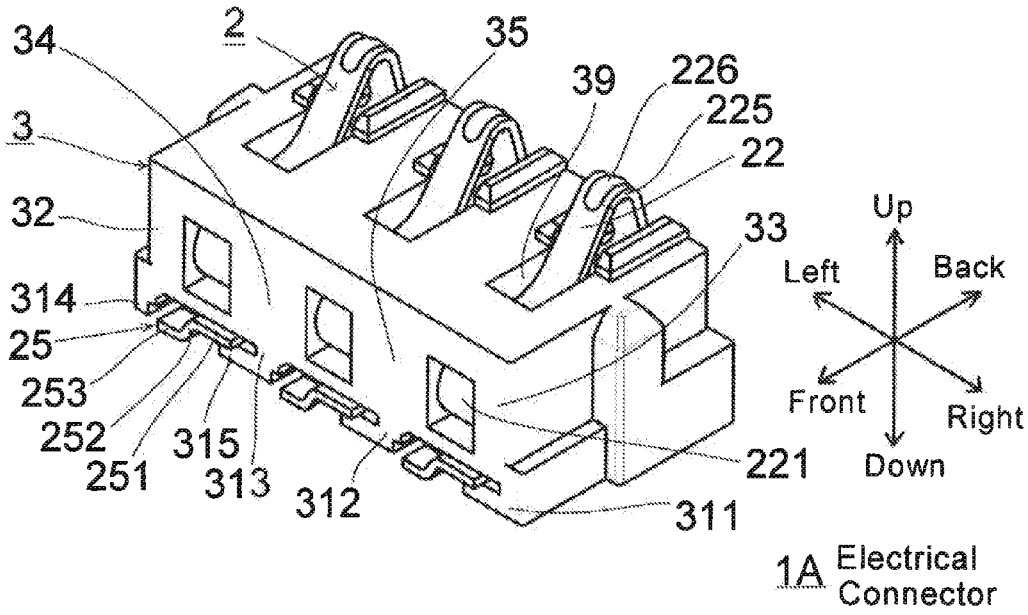
Up
Front
Back
Down
1A Electrical Connector

Fig. 15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Up
Left
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Front
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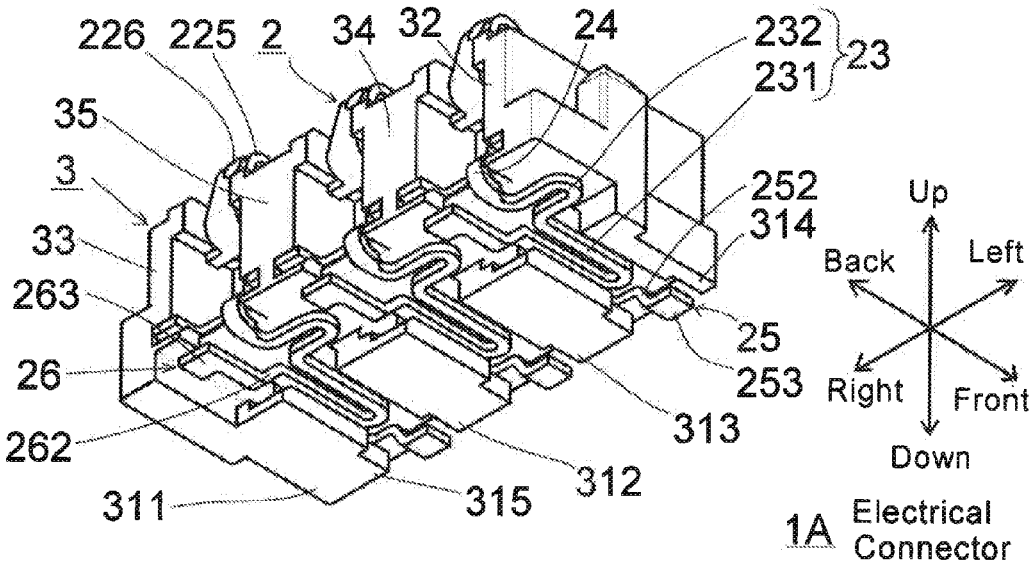
Down
1A Electrical Connector

Fig. 16


226
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1A Electrical Connector

ELECTRICAL CONNECTOR

TECHNICAL FIELD

The present invention relates to an electrical connector usable for a battery pack connecting portion of a portable video device etc., for example, and floatable on a mounting board.

BACKGROUND ART

An electrical connector is made up of a housing and a contact member and is mounted on a circuit board to elastically support a contact portion coming into contact with, for example, a terminal of a battery, at a predetermined position. For this type of electrical connector, a technique is known that provides a floating function allowing the housing and the contact portion to be displaced relative to the mounting circuit board in parallel with a board surface (see Patent Document 1). According to the floating function, a position gap tolerance between a case and the board can be absorbed in an assembly process of an end product. For example, when the same electrical connector is diverted to a different model etc., if the mounting position of the electrical connector must be shifted on a board while the same position of the contact portion is maintained, the same electrical connector is usable given that an amount of shift is within a displaceable range from the floating function. The same applies to when the position of the contact portion must be shifted without changing the mounting position of the electrical connector on the board.

PRIOR ART DOCUMENT

Patent Document

[Patent Document 1] Japanese Laid-Open Patent Publication No. 2010-118314

SUMMARY OF THE INVENTION

Problem to be Solved by the Invention

The electrical connector of Patent Document 1 is configured such that "the electrical connector includes a housing **10** made of a single member and a contact member **20** fixed to the housing **10**. The contact member **20** has a solder connecting portion **21** connected to a circuit board, an elastic portion **22** extending upward from the solder connecting portion **21** and folding back toward the housing **10** to extend downward, a fixing portion **23** that has one end **231** connected to a tip **222** of the elastic portion **22** extending downward and that extends in horizontal direction to be fixed to the vicinity of a bottom surface of the housing **10**, and a contact portion **24** extending upward from the other end **232** opposed to the one end **231** of the fixing portion **23**" (see [Abstract] of Patent Document 1), so as to realize the floating function with the elastic portion **22**. However, since one contact is soldered to the board at only one position on the rear side of the housing, a reinforcing plate (solder peg **30**) is substantially essential that is soldered to the board separately from the contact, increasing a parts count and assembly man-hours. Since the reinforcing plate must have elasticity for the floating function and has a complicated shape and a larger size as compared to a typical reinforcing plate and a displacement space must be ensured for the reinforcing plate, the electrical connector disadvantageously increases in size as a whole.

The present invention was conceived in view of the situations and it is therefore an object of the present invention to provide an electrical connector allowing a housing and a contact portion to be displaced relative to a mounting board in parallel with a board surface without disposing a reinforcing plate separately from a contact member.

Means for Solving the Problem

An aspect of the present invention is an electrical connector. The electrical connector comprises:

- an insulating housing; and
- a conductive contact member, wherein,
  - when a direction toward a mounting object board is downward, the contact member has
    - a basal portion fixed to the housing,
    - a contact-side elastic portion rising from the basal portion and having a contact portion,
    - first and second connecting leg portions, each tip side of which acts as mounting portion for the board at positions different from each other, and
    - a mounting-side elastic portion disposed between the basal portion and the first and second connecting leg portions, and
  - the housing has a convex portion formed on a lower surface thereof, wherein
    - a cover portion facing the lower surface of the housing extends from the convex portion, and
    - a portion of the first connecting leg portion is inserted in a gap between the lower surface of the housing and the cover portion.

The mounting-side elastic portion may be present on the lower surface side of the housing, and the contact member may have a folding-back portion located outside of the lower surface of the housing to connect one end of the mounting-side elastic portion and the basal portion.

Another aspect of the present invention is an electrical connector. The electrical connector comprises:

- an insulating housing; and
- a conductive contact member, wherein,
  - when a direction toward a mounting object board is downward, the contact member has
    - a basal portion fixed to the housing,
    - a contact-side elastic portion rising from the basal portion and having a contact portion,
    - a mounting-side elastic portion present on the lower surface side of the housing,
    - a folding-back portion located outside of the lower surface of the housing to connect one end of the mounting-side elastic portion and the basal portion, and
    - first and second connecting leg portions both extending downward from the other end of the mounting-side elastic portion, wherein each tip side of the leg portions acts as mounting portion for the board at positions different from each other.

The mounting-side elastic portion may have structure displaceable in front-back direction and left-right direction without displacement in up-down direction.

The mounting-side elastic portion may have a first U-shaped portion extending in the front-back direction and a second U-shaped portion extending in the left-right direction.

One housing may be provided with a plurality of the contact members aligned and held in the left-right direction with a partition wall portion interposed therebetween, and the second U-shaped portion of each of the contact members may be

shorter than the first U-shaped portion and be located on the rear side relative to a center position of the housing in the front-back direction.

One housing may be provided with a plurality of the contact members aligned and held in the left-right direction with a partition wall portion interposed therebetween, and the first and second connecting leg portions of each of the contact members may have the mounting portions for the board separated in the front-back direction.

A convex portion may be formed on the lower surface of a base portion of the housing, and the convex portion may come into contact with the first and second connecting leg portions to restrict an elastic deformation amount of the mounting-side elastic portion.

It is to be noted that any arbitrary combination of the above-described structural components as well as the expressions according to the present invention changed among a system and so forth are all effective as and encompassed by the present aspects.

Effect of the Invention

According to the present invention, since the contact member has first and second connecting leg portions acting as mounting portions for the mounting board at positions different from each other on the tip side, the electrical connector can be realized that allows the housing and the contact portion to be displaced relative to the mounting board in parallel with the board surface without disposing a reinforcing plate separately from the contact member.

BRIEF DESCRIPTION OF DRAWING

FIG. **1** is a right-side cross-sectional view of an electrical connector **1** according to a first embodiment of the present invention in a mounted state on a circuit board **9**.

FIG. **2** is a perspective view (part one) of the electrical connector **1**.

FIG. **3** is a perspective view (part two) of the electrical connector **1**.

FIG. **4** is a perspective view (part three) of the electrical connector **1**.

FIG. **5** is a front view of the electrical connector **1**.

FIG. **6** is a bottom view of the electrical connector **1**.

FIG. **7** is a right-side cross-sectional view of the electrical connector **1**.

FIG. **8** is an exploded perspective view (part one) of the electrical connector **1**.

FIG. **9** is an exploded perspective view (part two) of the electrical connector **1**.

FIG. **10** is a bottom view of the electrical connector **1** when rightward force is applied to a housing **3**.

FIG. **11** is a bottom view of the electrical connector **1** when leftward force is applied to the housing **3**.

FIG. **12** is a bottom view of the electrical connector **1** when backward force is applied to the housing **3**.

FIG. **13** is a bottom view of the electrical connector **1** when forward force is applied to the housing **3**.

FIG. **14** is a right-side cross-sectional view of an electrical connector **1**A according to a second embodiment of the present invention.

FIG. **15** is a perspective view (part one) of the electrical connector **1**A.

FIG. **16** is a perspective view (part two) of the electrical connector **1**.

EMBODIMENT FOR CARRYING OUT THE INVENTION

The invention will now be described based on the following embodiments which do not intend to limit the scope of the present invention but exemplify the invention. All of the features and the combinations thereof described in the embodiments are not necessarily essential to the invention.

FIG. **1** is a right-side cross-sectional view of an electrical connector **1** according to a first embodiment of the present invention in a mounted state on a circuit board **9**. FIGS. **2** to **4** are perspective views of the electrical connector **1**. FIG. **5** is a front view of the electrical connector **1**. FIG. **6** is a bottom view of the electrical connector **1**. FIG. **7** is a right-side cross-sectional view of the electrical connector **1**. FIGS. **8** and **9** are exploded perspective views of the electrical connector **1**. These figures define three orthogonal directions, i.e., front-back, up-down, and left-right directions.

The electrical connector **1** includes a conductive contact member **2** and an insulating housing **3**. For example, the housing **3** is an integral resin molded product and the contact member **2** is an integral metal plate. As depicted in FIG. **1**, the contact member **2** is surface-mounted by soldering to two solder connecting portions **91**, **92** on a circuit board **9**. An object to be connected, for example, a battery **7** is connected to the electrical connector **1** from the front side in this embodiment. As a result, an electrode (not depicted) of the battery **7** is electrically connected via the electrical connector **1** to a conductive pattern (not depicted) of the circuit board **9**.

Single structure of the contact member **2** and the housing **3** will first be described mainly with reference to FIGS. **8** and **9**.

The housing **3** has a base portion **31**, side wall portions **32**, **33**, partition wall portions **34**, **35**, and a ceiling portion **36** and these portions form three hole portions **38** such that a portion of the contact member **2** is housed in each of the hole portions **38**. The side wall portions **32**, **33** rise from both left and right ends of the base portion **31**. The partition wall portions **34**, **35** rise from the base portion **31** between the side wall portions **32**, **33**. The ceiling portion **36** is located between upper ends of the side wall portions **32**, **33** across upper ends of the partition wall portions **34**, **35**. Convex portions **311** to **314** projected downward are formed on a lower surface of the base portion **31**. Respective cover portions **315** facing the lower surface of the base portion **31** extend from tip portions of the convex portions **311** to **313**. Front end portions of right side surfaces of the convex portions **312** to **314** are formed as stepped wall portions **317** (FIG. **9**). The stepped wall portions **317** define a rightward maximum allowable displacement distance d**11** (FIG. **5**) of the housing **3** as described later.

The contact member **2** has a basal portion **21**, a contact-side elastic portion **22**, a mounting-side elastic portion **23**, a folding-back portion **24**, and first and second connecting leg portions **25**, **26**. The basal portion **21** has a planar shape extending in a horizontal plane (in a plane at the same position in the up-down direction). Structure of the contact member **2** upper than the basal portion **21** is known and therefore will briefly be described. The contact-side elastic portion **22** has a shape that extends backward and upward from a folding portion **221** at the front end of the basal portion **21**, that is folded back at a folding portion **222** on the rear side to extend forward and upward, and that is further folded backward at a folding portion **223** on the front side. A contact portion **224** convexed toward the front side and facing forward is formed on the folding portion **223** by press working, for example. If an electrode of the object to be connected is pressed against

the contact portion **224** from the front side, the contact portion **224** is retracted due to elastic deformation of the contact-side elastic portion **22**.

In the contact member **2**, the mounting-side elastic portion **23** extends on the lower side of the basal portion **21** in parallel with the basal portion **21**. One end of the mounting-side elastic portion **23** and the rear end of the basal portion **21** are connected by the folding-back portion **24** (folding portion). The first and second connecting leg portions **25**, **26** both extend downward from the other end of the mounting-side elastic portion **23**. Each tip side of the leg portions **25**, **26** acts as mounting portion for the circuit board **9** (FIG. **1**) at positions different from each other, which are positions separated in the front-back direction in this embodiment.

The mounting-side elastic portion **23** includes a first U-shaped portion **231** extending in the front-back direction and a second U-shaped portion **232** extending in the left-right direction. One end of the second U-shaped portion **232** is connected to the folding-back portion **24** while one end of the first U-shaped portion **231** is connected to the other end of the second U-shaped portion **232**, and the first and second connecting leg portions **25**, **26** separately extend in the respective front-back directions from the other end of the first U-shaped portion **231**. A length of the first U-shaped portion **231** in the front-back direction is longer than a length of the second U-shaped portion **232** in the left-right direction.

The first connecting leg portion **25** is a leg portion extending forward from the other end of the first U-shaped portion **231** and has a stored portion **251**, a first bent-up portion **252**, and a first surface mounting portion **253**. The stored portion **251** extends from the other end of the first U-shaped portion **231** and extends forward on the side (right side) of the first U-shaped portion **231**. The first surface mounting portion **253** is a tip portion of the first connecting leg portion **25** and is surface-mounted on the circuit board **9** (FIG. **1**) by soldering, for example. The first surface mounting portion **253** has an area capable of ensuring solder joint strength sufficient for surface mounting. The first bent-up portion **252** is portion connected to the front end side of the stored portion **251** by bending up a right end of the first surface mounting portion **253**.

The second connecting leg portion **26** is a leg portion extending backward from the other end of the first U-shaped portion **231** and has a second bent-up portion **262** and a second surface mounting portion **263**. The second surface mounting portion **263** is a tip portion of the second connecting leg portion **26** and is surface-mounted on the circuit board **9** (FIG. **1**) by soldering, for example. The second surface mounting portion **263** has an area capable of ensuring solder joint strength sufficient for surface mounting. The second bent-up portion **262** is portion connected to the other end of the first U-shaped portion **231** by bending up the front end of the second surface mounting portion **263**.

Combined structure of the contact member **2** and the housing **3** will then be described mainly with reference to FIGS. **2** to **7**.

The contact member **2** is assembled to the housing **3** from the rear side such that the base portion **31** of the housing **3** is interposed between the basal portion **21** and the mounting-side elastic portion **23** while the basal portion **21** and the contact-side elastic portion **22** are put through the hole portion **38** of the housing **3**. Since fixing claws **211** (FIGS. **8**, **9**) formed on the side edges (both edges) of the basal portion **21** enter the hole portion **38** to scrape the inner walls of the hole portions **38** and the fixing claws **211** bite into the inner walls of the hole portions **38**, the basal portion **21** is fixed to the housing **3** after assembling. A plurality (three in this embodiment) of the contact members **2** of the same shape is assembled to the single housing **3**.

The basal portion **21** of the contact member **2** is present along the upper surface of the base portion **31** of the housing **3**. The mounting-side elastic portion **23** of the contact member **2** is present along the lower surface of the base portion **31** of the housing **3**. The folding-back portion **24** of the contact member **2** is located at the rear of the base portion **31** of the housing **3** to connect the basal portion **21** and the mounting-side elastic portion **23**. The stored portion **251** of the first connecting leg portion **25** and a portion on the right side of the first U-shaped portion **231** of the contact member **2** are located (inserted) in a gap (terminal storage slit) between the lower surface of the base portion **31** and the cover portion **315** of the housing **3**.

The distance d**11** (FIG. **5**) between a side edge (left edge) of the first surface mounting portion **253** of the contact member **2** and the facing convex portion on the left side (the stepped wall portion **317** of the convex portion **312** to **314** of the housing **3**) is the rightward maximum allowable displacement distance of the housing **3** relative to the first surface mounting portion **253** (i.e., the mounting circuit board). In particular, if the housing **3** moves rightward by the distance d**11** relative to the first surface mounting portion **253**, the side edge (left edge) of the first surface mounting portion **253** comes into contact with the stepped wall portion **317** of the convex portions **312** to **314** of the housing **3** to restrict the rightward displacement of the housing **3** equal to or smaller than the distance d**11**.

A distance d**12** (FIG. **5**) between a side edge (right edge) of the stored portion **251** of the contact member **2** and the facing convex portion on the right side (the convex portion **311** to **313** of the housing **3**, i.e., a bottom surface **319** of the terminal storage slit) is the leftward maximum allowable displacement distance of the housing **3** relative to the first surface mounting portion **253** (i.e., the mounting circuit board). In particular, if the housing **3** moves leftward by the distance d**12** relative to the first surface mounting portion **253**, the side edge (right edge) of the stored portion **251** comes into contact with the convex portion **311** to **313** of the housing **3**, i.e., the bottom surface **319** of the terminal storage slit, to restrict the leftward displacement of the housing **3** equal to or smaller than the distance d**12**.

A distance d**21** between a front surface of the second bent-up portion **262** of the contact member **2** (a front surface of a portion extending forward and obliquely upward from the second surface mounting portion **263**) and a rear end surface of the cover portion **315** of the housing **3** is the backward maximum allowable displacement distance of the housing **3** relative to the second surface mounting portion **263** (i.e., the mounting circuit board). In particular, if the housing **3** moves backward by the distance d**21** relative to the second surface mounting portion **263**, the front surface of the second bent-up portion **262** comes into contact with the rear end surface of the cover portion **315** to restrict the backward displacement of the housing **3** equal to or smaller than the distance d**21**.

The forward displacement of the housing **3** relative to the mounting circuit board is not restricted by contact with the contact member **2**. However, when the second U-shaped portion **232** is compressed by a maximum compression distance d**22** (FIG. **6**) due to the forward displacement of the housing **3**, elastic resistance of the elastic portion **22** subsequently increases to substantially restrict further forward displacement of the housing **3**.

Operation of the floating function in the electrical connector **1** will hereinafter be described.

FIGS. **10** to **13** are bottom views of the electrical connector **1** when forward, backward, leftward, and rightward forces are applied to the housing **3**, and FIGS. **10**, **11**, **12**, and **13** depict the cases of application of rightward force, leftward force backward force, and forward force, respectively. In FIGS. **10** to **13**, it is assumed that the first and second surface mounting portions **253**, **263** are fixed to a circuit board not depicted and are immobile relative to the circuit board.

As depicted in FIG. **10**, if rightward force is applied to the housing **3**, the first U-shaped portion **231** is compressed (closed) and, therefore, the housing **3** can be displaced rightward relative to the first and second surface mounting portions **253**, **263** (i.e., the mounting circuit board). As depicted in FIG. **11**, if leftward force is applied to the housing **3**, the first U-shaped portion **231** is expanded (opened) and, therefore, the housing **3** can be displaced leftward relative to the first and second surface mounting portions **253**, **263**. As depicted in FIG. **12**, if backward force is applied to the housing **3**, the second U-shaped portion **232** is expanded (opened) and, therefore, the housing **3** can be displaced backward relative to the first and second surface mounting portions **253**, **263**. In this case, since the second U-shaped portion **232** is shorter than the first U-shaped portion **231**, if only the expansion and compression of the second U-shaped portion **232** are used, stronger resistance is generated against the forward and backward displacement of the housing **3** (the displacement becomes more difficult) as compared to the leftward and rightward displacement. However, since the housing **3** can be displaced backward not only by opening of the second U-shaped portion **232** but also by swinging (leftward tilting) of the first U-shaped portion **231** longer than the second U-shaped portion **232**, the resistance at the time of the backward displacement is reduced. As depicted in FIG. **13**, if forward force is applied to the housing **3**, the second U-shaped portion **232** is compressed (closed) and, therefore, the housing **3** can be displaced forward relative to the first and second surface mounting portions **253**, **263**. Since the housing **3** can be displaced forward not only by closing of the second U-shaped portion **232** but also by swinging (rightward tilting) of the first U-shaped portion **231** longer than the second U-shaped portion **232**, the resistance at the time of the forward displacement is reduced. By combining displacements in two directions, diagonal and rotational displacements can be accommodated.

According to the embodiment, the following effects are produced.

(1) Since the contact member **2** has the first and second connecting leg portions **25**, **26** both extending downward from the other end of the mounting-side elastic portion **23** and each tip side of the leg portions **25**,**26** acts as mounting portion for the circuit board at positions separated in the front-back direction, it is not necessary to separately dispose a reinforcing plate along with the contact member **2** unlike the case of soldering the contact member to the board at only one position on the rear side of the housing as in the conventional case. This eliminates increases in parts count and assembly man-hours due to the disposition of the reinforcing plate. To ensure the floating function while the reinforcing plate is used, the reinforcing plate must have elasticity, resulting in a complicated shape and a larger size as compared to a typical reinforcing plate, and a displacement space must be ensured for the reinforcing plate; on the other hand, since this embodiment requires no reinforcing plate, the size and cost of the electrical connector are reduced as a whole as compared to the conventional case using the reinforcing plate.

(2) Since the stored portion **251** of the first connecting leg portion **25** of the contact member **2** is always housed in a gap (the terminal storage slit) between the lower surface of the base portion **31** and the cover portion **315** of the housing **3**, when force is applied to the housing **3** in a direction of detachment from the board, the cover portion **315** is hooked to the stored portion **251** of the first connecting leg portion **25** of the contact member **2** and, therefore, the housing **3** can be prevented from being separated from the contact member **2** and being detached from the board without using another component. Although the reinforcing plate conventionally plays a role in this detachment prevention, this embodiment can prevent the detachment of the housing **3** without using the reinforcing plate.

(3) The contact member **2** and the housing **3** have an excessive displacement preventing function by its own in terms of the forward, backward, leftward, and rightward directions and can prevent excessive deformation or breakage of the contact member **2** (particularly, the mounting-side elastic portion **23**) due to excessive displacement without using another component. Although the reinforcing plate conventionally plays a role in this excessive displacement prevention, this embodiment can prevent the excessive displacement without using the reinforcing plate.

(4) Since the mounting-side elastic portion **23** of the contact member **2** is disposed on the lower surface side of the base portion **31** of the housing **3**, the mounting-side elastic portion **23** can be made up of the first U-shaped portion **231** extending in the front-back direction and the second U-shaped portion **232** extending in the left-right direction. The first and second U-shaped portions **231**, **232** are elastically deformable without torsion and can easily be displaced in the front-back and left-right directions without displacement in the up-down direction unlike a conventional configuration displaced in the left-right direction through torsional deformation of an elastic portion. Since the second U-shaped portion **232** extending in the left-right direction is made shorter than the first U-shaped portion **231** extending in the front-back direction, the swinging of the first U-shaped portion **231** having a longer length can be used for complementing the displacement in the front-back direction, which is associated with larger resistance because of a shorter length when only the elastic deformation of the second U-shaped portion **232** is used, while reducing an arrangement interval of the contact members **2** aligning in the left-right direction, and the resistance can be decreased at the time of the displacement in the front-back direction.

FIG. **14** is a right-side cross-sectional view of an electrical connector **1**A according to a second embodiment of the present invention. FIGS. **15** and **16** are perspective views of the electrical connector **1**A. The electrical connector **1**A is the same as the first embodiment except that a contact portion **226** of the contact member **2** faces upward. Specifically, the contact-side elastic portion **22** has a shape extending backward and upward from the folding portion **221** at the front end of the basal portion **21** and folded back downward at a folding portion **225** on the rear side. A contact portion **226** convexed toward the upper side and facing upward is formed on the folding portion **225** by press working, for example. If an electrode of the object to be connected is pressed against the contact portion **226** from the upper side, the contact portion **226** is retracted due to elastic deformation of the contact-side elastic portion **22**. The housing **3** has a groove portion **39** allowing the contact portion **226** to project in the ceiling portion **36**. This embodiment can produce the same effects as the first embodiment.

Described above is an explanation based on the embodiment. The description of the embodiments is illustrative in nature and various variations in constituting elements and processes involved are possible. Those skilled in the art would

readily appreciate that such variations are also within the scope of the present invention.

The mounting method of the electrical connector is not limited to surface mounting and may be through-hole mounting.

The number of the contact members **2** attached to the single housing **3** is not limited to three and may appropriately be designed depending on required specifications etc.

EXPLANATIONS OF LETTERS OR NUMERALS

1 Electrical connector
2 Contact member
21 Basal portion
22 Contact-side elastic portion
224 Contact portion
23 Mounting-side elastic portion
24 Folding-back portion
25 First connecting leg portion
251 Stored portion
252 First bent-up portion
253 First surface mounting portion
26 Second connecting leg portion
262 Second bent-up portion
263 Second surface mounting portion
3 Housing
31 Base portion
32,**33** Side wall portions
34,**35** Partition wall portions
36 Ceiling portion
38 hole portion

The invention claimed is:

1. An electrical connector comprising:
an insulating housing; and
a conductive contact member, wherein,
when a direction toward a mounting object board is downward, the conductive contact member has
a basal portion fixed to the insulating housing,
a contact-side elastic portion rising from the basal portion and having a contact portion,
first and second connecting leg portions having respective tip sides, each of the tip sides acting as a mounting portion for the board at positions different from each other, and
a mounting-side elastic portion disposed between the basal portion and the first and second connecting leg portions, and
the insulating housing has a convex portion located on a lower surface of the insulating housing, wherein
a cover portion facing the lower surface of the insulating housing extends from the convex portion, and
a portion of the first connecting leg portion is located in a gap between the lower surface of the insulating housing and the cover portion.

2. The electrical connector according to claim **1**, wherein
the mounting-side elastic portion is present on the lower surface side of the insulating housing, and
the contact member has a folding-back portion located outside of the lower surface of the insulating housing for connecting a first end of the mounting-side elastic portion to the basal portion.

3. The electrical connector according to claim **2**, wherein the mounting-side elastic portion has structure displaceable in a front-back direction and a left-right direction without displacement in an up-down direction.

4. The electrical connector according to claim **2**, wherein the mounting-side elastic portion has a first U-shaped portion extending in a front-back direction and a second U-shaped portion extending in a left-right direction.

5. The electrical connector according to claim **4**, wherein
the insulating housing includes a plurality of the conductive contact members aligned and held in the left-right directions by a partition wall portion interposed therebetween, and
the second U-shaped portion of each of the contact members is shorter than the first U-shaped portion and is located on a rear side, relative to a center position of the insulating housing, in the front-back direction.

6. The electrical connector according to claim **1**, wherein
the insulating housing includes a plurality of the conductive contact members aligned and held in a left-right direction by a partition wall portion interposed therebetween, and
the first and second connecting leg portions of each of the conductive contact members have the mounting-side elastic portions for the board separated in a front-back direction.

7. The electrical connector according to claim **1**, including
a convex portion on the lower surface of a base portion of the insulating housing, wherein the convex portion comes into contact with the first and second connecting leg portions to restrict elastic deformation of the mounting-side elastic portion.

8. An electrical connector comprising:
an insulating housing; and
a conductive contact member, wherein, when a direction toward a mounting object board is downward, the conductive contact member has
a basal portion fixed to the insulating housing,
a contact-side elastic portion rising from the basal portion and having a contact portion,
a mounting-side elastic portion on the lower surface side of the insulating housing,
a folding-back portion located outside of the lower surface of the insulating housing for connecting a first end of the mounting-side elastic portion to the basal portion, and
first and second connecting leg portions having respective tip sides, each of the first and second connecting leg portions extending downward from a second end of the mounting-side elastic portion, wherein each of the tip sides of the first and second connecting leg portions acts as a mounting portion for the board at positions different from each other.

9. The electrical connector according to claims **8**, wherein the mounting-side elastic portion has structure displaceable in a front-back direction and a left-right direction without displacement in an up-down direction.

10. The electrical connector according to claim **8**, wherein the mounting-side elastic portion has a first U-shaped portion extending in a front-back direction and a second U-shaped portion extending in a left-right direction.

11. The electrical connector according to claim **10**, wherein
the insulating housing includes a plurality of the conductive contact members aligned and held in the left-right direction by a partition wall portion interposed therebetween, and
the second U-shaped portion of each of the contact members is shorter than the first U-shaped portion and is located on a rear side, relative to a center position of the insulating housing, in the front-back direction.

12. The electrical connector according to claim 8, wherein

the insulating housing includes a plurality of the conductive contact members aligned and held in a left-right direction by a partition wall portion interposed therebetween, and

the first and second connecting leg portions of each of the conductive contact members have the mounting-side elastic portions for the board separated in a front-back direction.

13. The electrical connector according to claim 8, including

a convex portion on the lower surface of a base portion of the insulating housing, wherein the convex portion comes into contact with the first and second connecting leg portions to restrict elastic deformation of the mounting-side elastic portion.

* * * * *